



Dart Hawkesbury
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

④

D350-748-143TRN
Job Sheet 164741



Part No: D350-748-143TRN

Job Qty: 1 ea

Part Name: Ss Crosstube Turning Detail



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 9/30/17

Job Tracking No:

Due Date: 10/31/17

Created By: Mario Poulin

Type: Stock

Description:

Note: DWG REV A NEW ISSUE - PRELIM - LL 12.05.08

Ship Via:

Bill of Materials

Part/Part Name	Part Note	Serial No	Quantity	Location
D350-748-143TRN	DWG REV A NEW ISSUE - PRELIM - LL 12.05.08		0.000	
Ss Crosstube Turning Detail				
D6021-125	DWG REV A		0.000	
Crosstube Material - 17-4Ph SS				

Job Routing

Op No	Operation	Qty	Due Date	Standard		Workcenter/Supplier	
				Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time
90	Start up Operation	1 Ea	10/30/17	0.00	0.00	Start up container	Crosstube
100	Mori Seiki	1 pcs	10/30/17	7.06	3.13	Mori Seiki TL-40	M.D. 8:06
110	QC	1 pcs	10/30/17	0.00	0.00	QC2	M.D. 8:06
120	Mori Seiki	1 pcs	10/30/17	0.00	3.13	Mori Seiki TL-40	M.D. 8:06
130	QC	1 pcs	10/30/17	0.00	0.00	QC2	M.D. 8:06
140	QC	1 pcs	10/30/17	0.00	0.00	QC8	GP 18-06-20
150	Crosstubes	1 pcs	10/31/17	0.00	0.98	Crosstube	GP 18-06-27
190	Packaging	1 pcs	10/31/17	0.00	0.00	Packaging3	GP 18-06-27
200	QC21-SA	1 Ea	10/31/17	0.00	0.00	QC21	21 JUN 27 2018

Part Op 100 - 1-Cut tube on chop saw, leave extra mat'l for facing and install plugs 350-141 on both ends. 2- Face both sides of
Descriptions: tube. 3- Turn program 02000 section on both side as per folio FB467. 4- Turn program 03000 section on both side as per
folio FB467. 5- Blend transsition lines only with belt sander 60 grit Dwg rev: A
120 - 1- Turn program 04000 section on both side as per folio FB467. 2- Blend transsition lines only with belt sander 60
grit 3- Scribe part # as per Dwg D350-748-143
130 - PERFORME ULTRASONIC MEASURMENT
150 - 1-Grind machining marks
190 - Identify and stock in kanban rack

Job BOM

Part / Item	Component Name	Quantity	Operation	Special Comments
D6021-125	Crosstube Material - 17-4Ph SS	1 Ea (1 ea)	90-Start up Operation	

B127272

Job Allocations

Operation	Component Part	Required	Inventory	Allocated	Std Qty
90-Start up Operation	D6021-125	1	0	0	0

Part Specifications

Specifications could not be found.



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
CANADA
TEL.: 1 613 832-5200
Email: sales@dartero.com
www.darteospace.com

Container No: S081403



Part: D350-748-143TRN

Job No: 164741

Serial No/Batch: S081403

Revision:

Inspector:

Exp Date:

Instructions:

Date: 06/15/18

Work Order ID 164741

Friday, July 28, 2017 8:58:31 AM

164741

Page 1

Item ID: D350-748-143TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: SS Crosstube Turning Detail

Start Date: 8/3/2017 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/1/2017 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: uDate: 7/7/28

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D350-748-143

A

100

1.42

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

1.17

Mori Seiki CNC Lathe Large

1-Cut tube on chop saw, leave extra mat'l for facing and install plugs 350-141 on both ends.

2-Face both sides of tube.

3- Turn program 02000 section on both side as per folio FB467.

4- Turn program 03000 section on both side as per folio FB467.

5- Blend transsition lines only with belt sander 60 grit

Folio rev: ADwg rev: A

110

QC2- Inspect parts off machine FAI/FAIB

0.00

110

QC

Memo

0.00

Quality Control

Work Order ID 164741

Friday, July 28, 2017 8:58:31 AM

164741

Page 2

Item ID: D350-748-143TRN

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: SS Crosstube Turning Detail

Start Date: 8/3/2017 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/1/2017 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

120

0.00

120

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

2.93

Mori Seiki CNC Lathe Large

1- Turn program 04000 section on both side as per folio FB467.

2- Blend transsition lines only with belt sander 60 grit

3- Scribe part # as per Dwg D350-748-143

Folio rev: ADwg rev: A

130

QC2- Inspect parts off machine FAI/FAIB

0.00

130

QC

Memo

0.00

Quality Control

PERFORME ULTRASONIC MEASURMENT

Work Order ID 164741

Friday, July 28, 2017 8:58:32 AM

164741

Page 3

Item ID: D350-748-143TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: SS Crosstube Turning Detail

Start Date: 8/3/2017 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/1/2017 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	QC8- Inspect parts - second check	0.00							
140									
QC	Memo	0.02							
Quality Control									
150	Large Fab	0.00							
150									
Crosstubes	Memo	0.66							
Crosstubes	1-Grind machining marks								
190	Packaging	0.00							
190									
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: _____								

Work Order ID 164741

Friday, July 28, 2017 8:58:32 AM

164741

Page 4

Item ID: D350-748-143TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: SS Crosstube Turning Detail

Start Date: 8/3/2017 Start Qty: 1.00

1

Cust Item ID:

Required Date: 9/1/2017 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

QC21- Final Inspection - Work Order Release

0.00

200

QC

Memo

0.10

Quality Control

Picklist Print

Friday, July 28, 2017 8:58:31 AM

Page 1

Work Order ID: 164741

164741

Parent Item: D350-748-143TRN

D350-748-143TRN

Parent Item Name: SS Crosstube Turning Detail

Start Date: 8/3/2017

Required Date: 9/1/2017

Start Qty: 1.00

Required Qty: 1.00

Comments: NEW ISSUE - PRELIM - LL 12.05.08

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6021-125		Manufactured	No			100	Each	77.0000	1	1			

D6021-125

Crosstube Material - 17-4Ph SS

Location

Loc Qty

Loc Code

HALL

61

127271

11

151690

25

151691

25

LG

16

127272

16

Item	Qty -143	Part Number	Description
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	1	D6021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
6	1	NAS1149C0363R	WASHER (OR AN960C10)
7	1	NAS1635-3-8	SCREW (OR MS51958-63)
8	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125 (17-4PH)
FINISHED LENGTH AFTER TURNING = 112.270±0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER 'D350-748-143' AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH TUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 164741
WMC 17/7/28

UNDER REVIEW

15/11/24
GRF 18-541

DEO ATTACHED

RELEASED

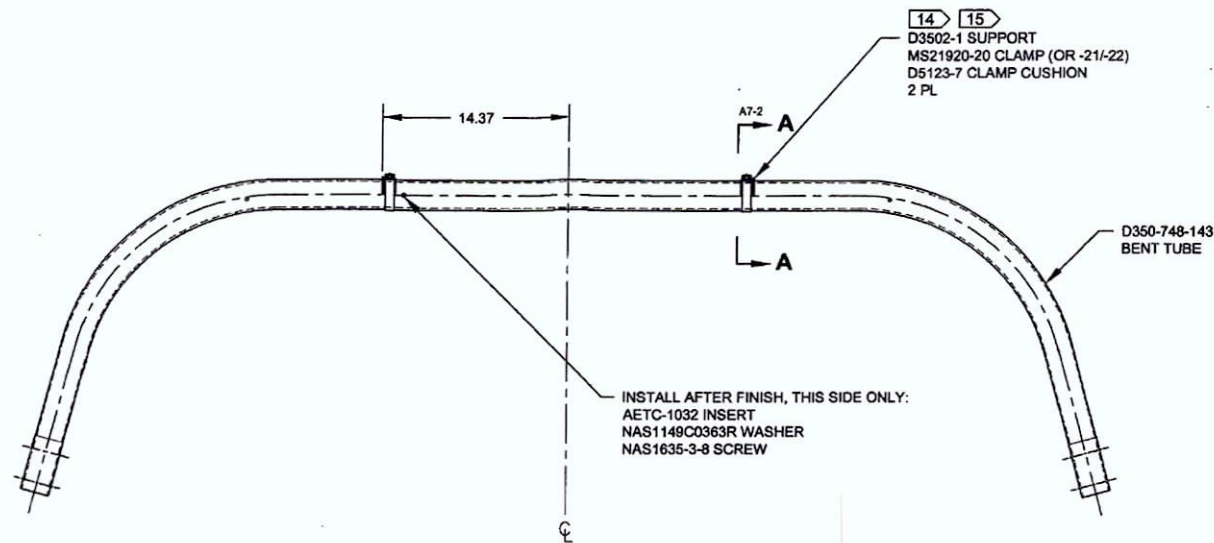
2015 MAR 18

92 EN 15-547

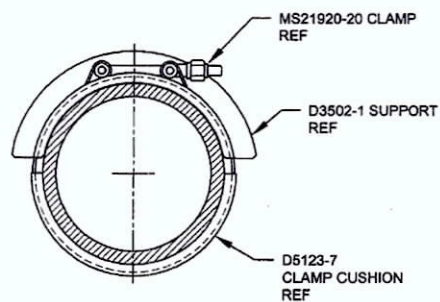
A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN	90		
DRAWN	90		
CHECKED	A.P.		
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D350-748-143	REV. A SHEET 1 OF 4
TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS

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**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

DEO ATTACHED

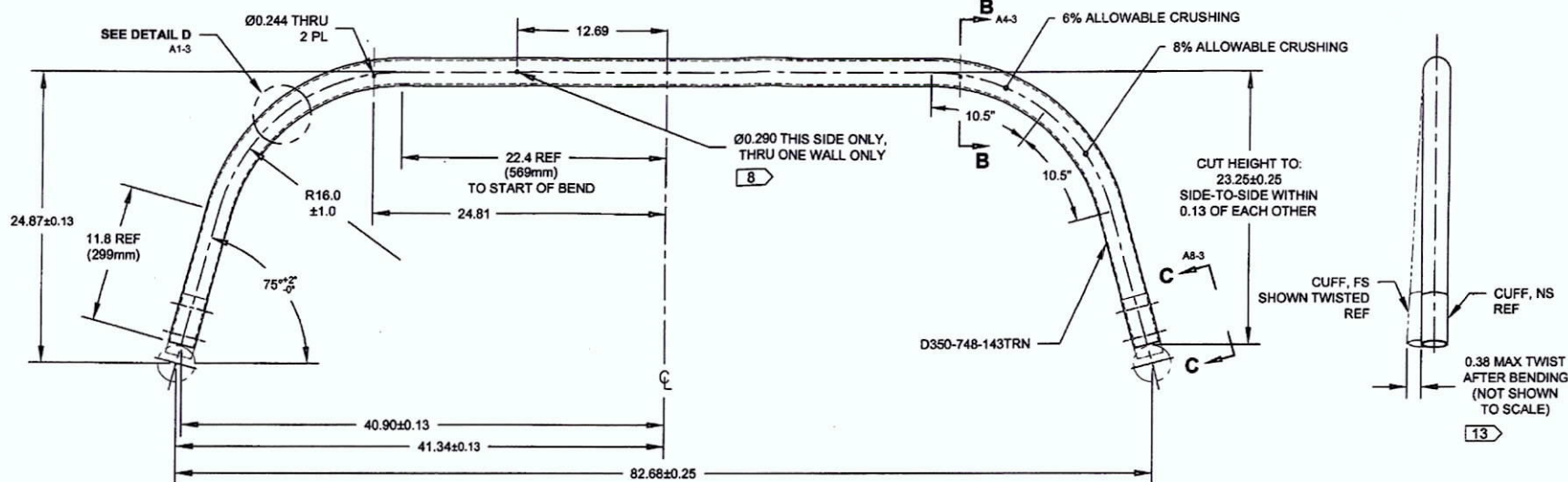
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2015 MAR 18
47 ECU-15-547

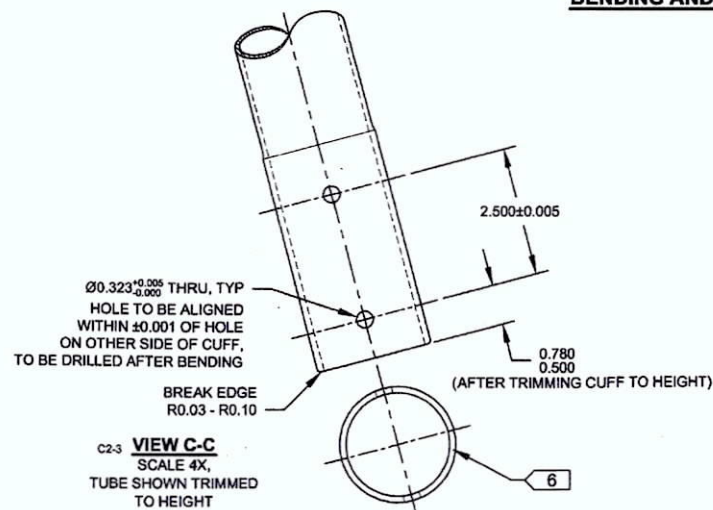
UNDER REVIEW

15/1/23 ck
9/4/25

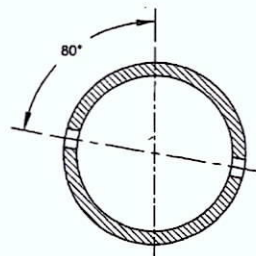
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DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	[Signature]	D350-748-143	SHEET 2 OF 4
APPROVED	[Signature]	TITLE	SCALE
DE APPR.	[Signature]	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD	
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D350-748-143
BENDING AND DRILLING DETAIL 11



VIEW C-C
SCALE 4X,
TUBE SHOWN TRIMMED
TO HEIGHT

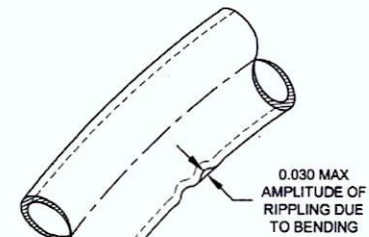


SECTION B-B D3-3
SCALE 6X

RELEASED
2015 MAR 18
DEO ATTACHED

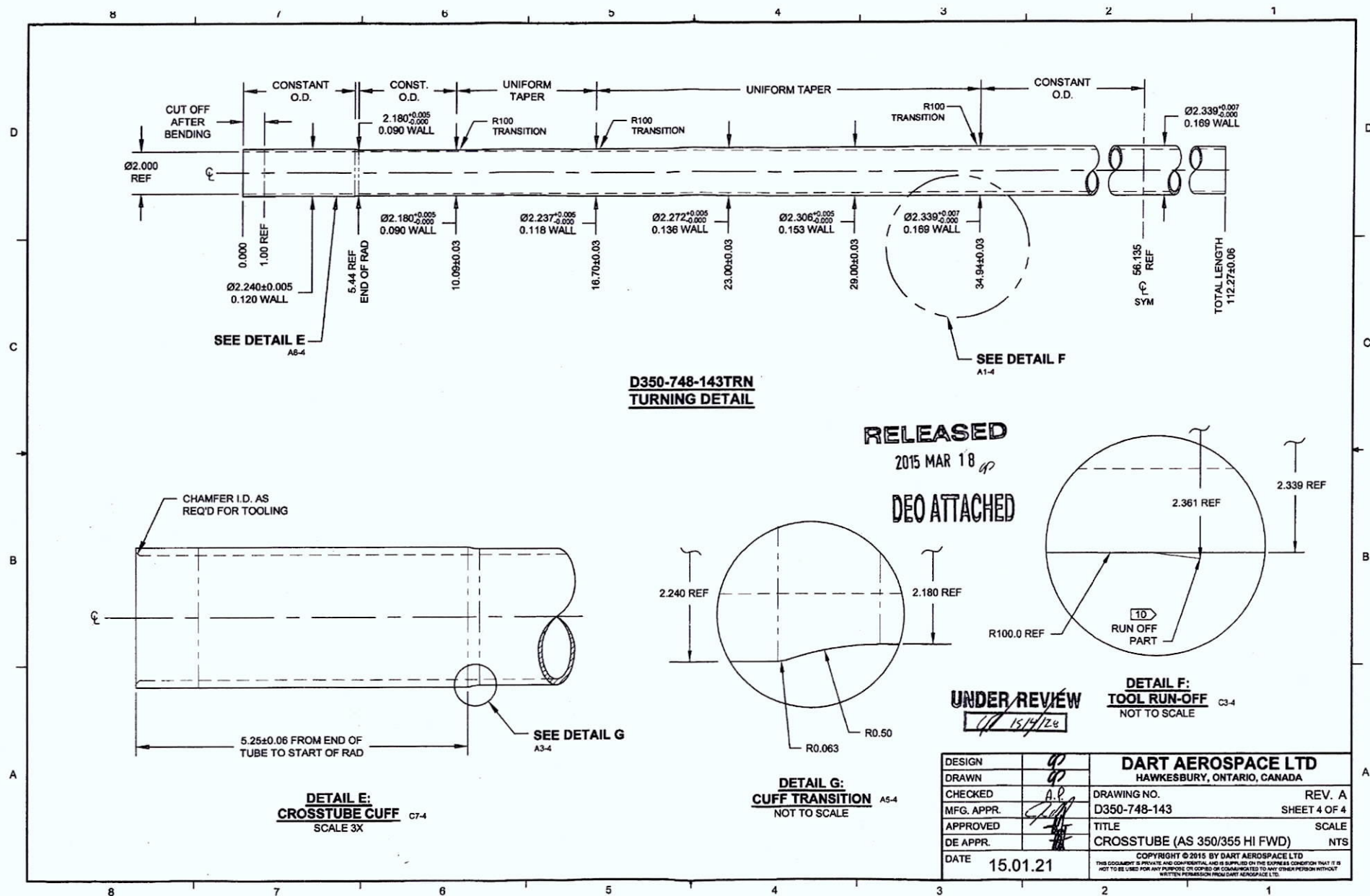
UNDER REVIEW

15/4/2015
9/4/2015



DETAIL D D7-3
SCALE 4X
RIPPING EXAGGERATED

DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
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DRAWING NO. D350-748-143	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-143-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>q</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>LM</i>	APPROVED <i>LM</i>		DE APPR. <i>LM</i>		
DATE 15.11.18	DATE 15.11.18	DATE 16.02.19	DATE FEB 19 2016		DATE 2016.02.19		

AMEND NOTE 2 (SHEET 1) AS FOLLOWS:

- 2) FINISH: PREPARE SURFACE PER DART QSI 005 4.1.4
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
 OR
 POWDER COAT WHITE (4.3.5.2) PER DART QSI 005 4.3

RELEASED
 2016 -02- 26

ECN 16-534

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DART AEROSPACE LTD	Work Order: 164741
Description: Crosstube Assembly (AS350/355 High Fwd SS)	Part Number: D350-748-143
Inspection Dwg: D350-748-143 Rev: A	Page 1 of 2

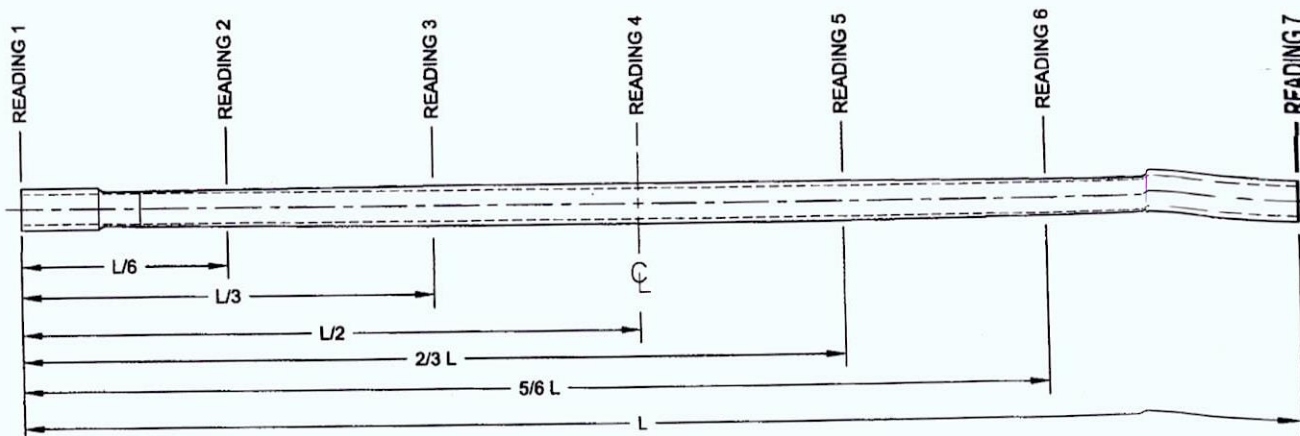
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+/-0.005	2.245	✓		BLM3"04	
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.185	✓			
	2.237	+0.005/-0.000	2.242	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.306	+0.005/-0.000	2.311	✓			
	2.339	+0.007/-0.000	2.346	✓		Vern 08	
	2.339	+0.007/-0.000	2.346	✓		Vern 08	
	0.062	+/-0.010	.062	✓		RG	
	5.25	+/-0.060	5.2475	✓		Vern 08	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		RG	
SIDE B	2.240	+/-0.005	2.245	✓		BLM3"04	
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.185	✓			
	2.237	+0.005/-0.000	2.242	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.306	+0.005/-0.000	2.311	✓			
	2.339	+0.007/-0.000	2.346	✓		Vern 08	
	2.339	+0.007/-0.000	2.346	✓		Vern 08	
	0.062	+/-0.010	.062	✓		RG	
	5.25	+/-0.060	5.2505	✓		Vern 08	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		RG	
	112.27	+/-0.060	112.27	✓		Tape	

4

DART AEROSPACE LTD		Work Order: 1647
Description: Crosstube Assembly (AS350/355 High Fwd SS)		Part Number: D350-143
Inspection Dwg: D350-748-143 Rev: A		Page: 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.144	.135	.137	.139	.009	0.000"
READING 2 L= 18.71	.144	.140	.138	.144	.006	
READING 3 L= 37.42	.199	.191	.187	.193	.012	
READING 4 L= 56.14	.191	.191	.192	.192	.001	
READING 5 L= 74.85	.189	.196	.199	.191	.010	
READING 6 L= 93.56	.144	.144	.148	.141	.007	
READING 7 L= 112.27	.139	.141	.133	.140	.008	

Calibration Result

Actual Block Thickness: 100-200

Sitescan 250 Measured Thickness: 100-200

Measured by: M.D. PMP	Audited by: GP 180620	Preliminary Approval:
Date: 2018-06-14	Date:	Date:

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue (P/O D350-748-103)	KJ	AA